

LIPEL™
Bacillus thuringiensis var Kurstaki
Bio Pesticide
(Regd in Central Insecticides Board, Govt of India)
APPROVED FOR USE IN ORGANIC AGRICULTURE

Introducing LIPEL™

LIPEL™ is a biological pesticide based on a selected strain of naturally-occurring beneficial soil bacteria *Bacillus thuringiensis var Kurstaki* (NCIM 2514) that protects crops from several insect pests belonging to Orders Lepidoptera (moths and butterflies), Diptera (flies and mosquitoes), Coleoptera (beetles), Hymenoptera (wasps, bees, ants and sawflies). It is used as an effective foliar spray.

LIPEL™ contains endospores of *Bacillus thuringiensis var Kurstaki*. It is formulated as 18,000 IU/mg Wettable Powder Formulation. LIPEL™ is registered by Indian Pesticides Regulatory Authority - Central Insecticides Board, Govt of India. LIPEL™ is approved for use in Organic agriculture.

A Historical Brief

Bacillus thuringiensis was first discovered in 1901 by Japanese biologist Shigetane Ishiwatari. It was re-discovered in 1911 in Germany by Ernst Berliner, who isolated it as the cause of a disease called Schläffsucht in flour moth caterpillars. In 1976, Zakharyan reported the presence of a plasmid in a strain of *Bacillus thuringiensis* and suggested the plasmid's involvement in endospore and crystal formation. Spores and crystalline insecticidal proteins produced by *Bacillus thuringiensis* have been used to control insect pests as early as 1920s. It has now become more insect specific.

Mode of Action

Sporulation: The endospores are released through sporulation upon contact with the insect after spraying.

Protein formation: Upon sporulation crystal proteins or CRY proteins are formed that produce δ -endotoxins which are encoded by cry genes that have insecticidal action. The cry genes are located on the plasmid. When insects ingest toxin crystals, the alkaline pH of their digestive tract activates the toxin. Cry toxin gets inserted into the insect gut cell membrane, forming a pore. The pore results in cell lysis and eventual death of the insect.

Receptor site compatibility: Time taken for the occurrence of death is dependent on the presence of specific receptor sites on the insect's gut wall. Also this match between toxin and receptor sites determines the range of insect species killed by *Bacillus thuringiensis var. kurstaki*. When the activated toxin attaches to receptor sites, it paralyzes and destroys the cells of the insect's gut wall, allowing the gut contents to enter the insect's body cavity and bloodstream.

Method of Application

Foliar application: Mix LIPEL™ in water and spray on crops. Dilution in water depends on IU/mg of formulation – 2 g/L of water for 18,0000 IU /mg WP formulation and 1 g/L of water for 32,000 IU / mg WP / Liquid formulation.

Dusting : Dust (100 IU / mg) LIPEL @ 25 Kg / Ha .

Note: It should not be mixed with strong alkaline chemicals or bactericides. Since it is poisonous to silkworm, it is advised not to use Lipel™ near Sericulture area

Target Pests

Lepidopeterous pests, Diamond Back Moth , Leaf eating caterpillars , Loopers and Fruit borers

Crops

LIPEL™ is suitable for application on Cereals , Millets , Pulses, Oilseeds, Fibre Crops , Sugar Crops , Forage Crops , Plantation crops ,Vegetables, Fruits, Spices , Flowers , Medicinal crops , Aromatic Crops , Orchards and Ornamentals

Compatibility

LIPEL™ is compatible with BioPesticides and Bio Fertilizers

Shelf Life

LIPEL™ is stable for a period of 12 months from the date of manufacturing.

Mass Composition

CONSTITUENT	W/W %	FUNCTION
<i>Bacillus thuringiensis var. Kurstaki</i> (spores)	08.00%	Active
Delta endotoxin	08.00%	Active
Nutrient medium residues	37.00%	Inactive
Sodium chlorise	15.00%	Inactive
Moisture	09.00%	Inactive
Fillers – Dextrose/Aqua base	q.s..	Inactive

BIOLOGICAL COMPOSITION

CONSTITUENT	IU	FORMULATION
<i>Bacillus thuringiensis var. Kurstaki</i>	18,000	Wettable Powder

OTHER FORMULATIONS AVAILABLE

Bacillus thuringiensis var. Kurstaki	IU/mg	32,000 Wettable Powder
Bacillus thuringiensis var. Kurstaki	IU/mg	1,000 Dusting Powder

Free from Salmonella, Shigella , E.Coli

Cautions for handling and use of product

1. Avoid inhalation and skin contact while diluting as there could be spillage / splashes of the product.
2. Mixing and spraying equipment is to be thoroughly rinsed with water and detergent before using the same equipment for spraying other pesticides.
3. Surplus spray solution should not be disposed in crop lands / stagnant water / flowing water where there is a possibility of causing pollution to natural resources.
4. Do not eat / drink / smoke during application.
5. Direct incidence of LIPEL[™] may cause irritation and therefore it is recommended that the operator should use protective gear viz gloves, apron, mask, eye gear and hood.

Symptoms and Antidotes

Symptoms: Occasional symptoms include head ache, nausea, giddiness, vomiting, stomach ache and blurred vision.

Antidote: In the case of ingestion: symptomatic treatment is advised. In the case of contact with Eyes: Flush with water liberally for 20 minutes. In case of Skin contact, wash the affected area with plenty of water and soap.

Citations

There are many citations in public domain on effectiveness of *Bacillus thuringiensis var Kurstaki* as a BioPesticide

Commitment to Nature

- LIPEL[™] is approved for use in organic agriculture.
- LIPEL[™] can be used as an effective component in IPM programmes, thereby leading to a reduction in use of chemical pesticides/ fungicides and creating a safer soil environment.
- LIPEL[™] does not lead to residue problems and doesn't cause resistance or resurgence problems.

Benefits from LIPEL[™]

- LIPEL[™] effectively controls most of the economically important pests like Lepidopeterous pests, Diamond Back Moth , Leaf eating caterpillars , Loopers and fruit borers
- Harmful insect load reduction leads to improved plant health and thereby increased crop productivity.
- LIPEL[™] is earthworm friendly , pet friendly , eco friendly and infant friendly